
PROTOCOL FOR ENVIRONMENTAL MANAGEMENT

**GREENHOUSE GAS
EMISSIONS AND ENERGY
EFFICIENCY
IN INDUSTRY**

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GREENHOUSE GAS EMISSIONS AND ENERGY EFFICIENCY IN INDUSTRY

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1 INTRODUCTION

This Protocol for Environmental Management (PEM) is an incorporated document of the State environment protection policy (Air Quality Management) (SEPP (AQM)).

1.1 Purpose

This protocol provides guidance for businesses on the SEPP (AQM) and its requirements for the management of greenhouse gas emissions and energy consumption (primarily clause 33 (1), (2) and (3)). The protocol specifies the steps that will need to be taken by businesses to demonstrate compliance with the policy principles and provisions of SEPP (AQM) related to energy efficiency and greenhouse gas emissions, and how EPA will assess compliance.

1.2 Objectives

The protocol aims to ensure that Victorian businesses subject to EPA works approvals and licensing system that have an impact on the environment in terms of their energy consumption and greenhouse gas emissions (as defined in the protocol):

- take up cost-effective opportunities for greenhouse gas mitigation, noting that in many cases they will achieve cost savings through greater energy efficiency; and
- integrate consideration of greenhouse and energy issues within existing environmental management procedures and programs.

The approach set out in the protocol is intended to support these objectives, in particular, by promoting

integrated environmental management, including energy management. The protocol will support businesses in addressing the greenhouse implications (including energy use) of their activities, and assist them to respond in ways that will strengthen their long-term business sustainability.

The protocol also seeks to streamline procedures in order to minimise duplication of requirements with other programs in which a business may be involved, such as the Energy Smart Business Program of the Sustainable Energy Authority, and the Commonwealth's Greenhouse Challenge Program.

1.3 Scope

The protocol applies to those businesses defined under the *Environment Protection (Scheduled Premises and Exemption) Regulations 1996* as premises requiring works approvals and licences¹ under the *Environment Protection Act 1970*.

¹ The *Environment Protection (Scheduled Premises and Exemptions) Regulations 1996* designates certain industrial or commercial activities (scheduled categories) as belonging to one or more of the following six types as defined in the *Environment Protection Act 1970*:

- waste discharged or likely to be discharged to the atmosphere;
- waste discharged or likely to be discharged onto any land or into any water;
- noise is or is likely to be emitted;
- sites which accept any prescribed waste for the purposes of reprocessing, treatment, storage or disposal; or which generate and then reprocess, treat, store or dispose of certain wastes (listed in the Regulations);
- premises where EPA may require a financial assurance to cover future clean up costs; and
- premises in which any ozone depleting substance is handled.

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1.4 **Explanation of Terms**

1.4.1 **Applicants**

For the purposes of this protocol, the term ‘applicants’ refers to businesses that make an application for a licence, accredited licence, licence amendment, works approval, or research, development and demonstration approval.

1.4.2 **Best practice and Eco-efficient**

‘Best practice’ means the best combination of eco-efficient techniques, methods, process or technology used in an industry sector or activity that demonstrably minimises the environmental impact of a generator of emissions in that industry sector or activity.

‘Eco-efficient’ means producing more goods and services with less energy and fewer natural resources, resulting in less waste and pollution.

Expectations with respect to the adoption of best practice by individual businesses will depend on technical, logistical and financial considerations.

Technical and logistical considerations include a wide range of issues that will influence the practicability of different technologies and practices. For example, whether a particular technology is compatible with an enterprise’s existing production processes.

In relation to energy efficiency and greenhouse gas emissions, financial considerations are as follows:

Energy efficiency – the benchmark for financial feasibility will generally be a payback period of up to three years. The discount rate/internal rate of return to be used in making an assessment of financial feasibility should be the current bank bill rate. For

long-lived assets (more than 10 years) a full life-cycle analysis should be undertaken, with appropriate payback periods considered on a case-by-case basis between the enterprise and EPA. The payback periods should include consideration of savings achieved through reduced energy bills, operational cost savings and enhanced productivity.

Non-energy related greenhouse gas emissions – financial feasibility will be considered on a case-by-case basis through discussions between the licence holder and EPA.

In assessing best practice, a range of environmental issues, in addition to greenhouse gas emissions and energy efficiency, will often also need to be considered. In the event that potential conflicts between these issues are identified, this will need to be discussed with EPA’s client manager and a preferred approach agreed.

1.4.3 **Categorisation of licence holders and applicants on the basis of the level of energy use and/or CO₂-equivalent emissions per annum²**

Less than 500 gigajoules per annum or less than 100 tonnes of energy-related CO₂-equivalent emissions per annum – licence holders or applicants whose predicted or actual annual energy consumption is less than 500 gigajoules or less than

² Licence holders can be categorised according to their level of energy consumption (in gigajoules) or CO₂-equivalent emissions from energy consumption. Different forms of energy produce different levels of CO₂-equivalent emissions. For example 10,000 GJ of gas has the same energy content as 2800 MWh of electricity. Consumption of 10,000 GJ of gas generates around 500 tonnes of CO₂-equivalent – consequently a licence holder consuming this amount of gas would fall in middle category. However, a licence holder consuming 2800 MWh of electricity (equivalent energy content of 10,000 GJ) would be responsible for the emission of around to 3300 tonnes of CO₂-equivalent - such a licence holder would fall in highest category.

100 tonnes of energy related CO₂-equivalent emissions.

500 to 7,000 gigajoules per annum or 100 to 1,400 tonnes of energy-related CO₂-equivalent emissions per annum – licence holders or applicants whose predicted or actual annual energy consumption is between 500 and 7,000 gigajoules or 100 to 1,400 tonnes of energy-related CO₂-equivalent emissions.

More than 7,000 gigajoules per annum or more than 1,400 tonnes of CO₂-equivalent emissions per annum – licence holders or applicants whose predicted or actual annual energy consumption is greater than 7,000 gigajoules 1,400 tonnes of CO₂-equivalent emissions.

The support materials (available from EPA) include conversion factors for electricity, gas, oil and other forms of energy to gigajoules.

1.4.4 Australian Standard 3598:2000 Energy Audits

This Standard defines three levels of energy audits.

Level 1 audit – allows the overall energy consumption of the site to be evaluated to determine whether energy use is reasonable or excessive. It also provides initial benchmarks of energy consumption at a site so that the effect of measures to improve energy efficiency can be tracked and evaluated.

Level 2 audit – identifies the source(s) of energy used at a site, the amount of energy used and the purposes for which it is used. It also identifies areas where savings can be made, recommends measures to be taken, and provides a statement of costs and potential savings.

Level 3 audit – provides a detailed analysis of energy usage, the savings that can be made, and the cost of achieving those savings. It may cover the whole site or may concentrate on an individual item, such as a specific service or industrial process.

1.4.5 Greenhouse gases

The following greenhouse gases are subject to requirements under this protocol – carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons and sulfur hexafluoride.

1.5 Key features of the protocol

The approach underpinning the protocol is to ensure that individual businesses understand and manage their energy consumption and greenhouse gas emissions as part of ongoing integrated environmental management processes, systems and reporting. While it is recognised that some businesses are already well advanced down this path, it is also recognised that many businesses in Victoria, to date, have not regarded energy efficiency and greenhouse gas emissions as important issues.

This protocol has been designed in recognition of these differences. In particular, for those businesses where greenhouse gas emissions and energy efficiency have not been a major consideration to date, the protocol and supporting programs aim to provide detailed guidance on assessing emissions; advice on options to reduce emissions; and adequate lead times for compliance.

For those businesses that are already well-advanced in their management of greenhouse and energy issues, the protocol provides formal recognition of their actions to date and integrates existing

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commitments and reporting requirements into the EPA Victoria licensing and works approvals system.

Assessment of compliance with the protocol will be on a case-by-case basis, considering individual businesses and their circumstances, and the context of the industry within which they operate.

The Protocol:

- **Requires implementation of best practice with respect to greenhouse gas emissions and energy consumption.** Businesses subject to EPA works approvals and licences will need to demonstrate that they have identified and implemented best practice, in accordance with the procedural steps outlined in Section 2 of this protocol.
- **Integrates consideration of energy efficiency and greenhouse gas emissions with other EPA licensing requirements.** This approach promotes consideration of energy efficiency and greenhouse gas emissions reduction as part of an integrated approach to environmental management – including consideration as part of an Environment Improvement Plan (EIP) where these are prepared by a licence holder.
- **Recognises prior actions to improve energy efficiency and reduce greenhouse gas emissions as contributing to demonstration of compliance.** Actions undertaken as part of Greenhouse Challenge and Energy Smart Business programs will be recognised as contributing to the demonstration of compliance with this protocol.
- **Establishes requirements for improving the energy efficiency of existing licensed premises**

that recognise differences in the level of energy consumption of different businesses. The compliance process for existing licence holders whose annual level of energy consumption is less than 7,000 gigajoules or less than 1,400 tonnes of energy-related CO₂-equivalent emissions will be simpler than the process requirements for businesses whose annual energy consumption or energy-related greenhouse gas emissions are greater than this.

- **Provides existing licence holders with lead time for demonstrating compliance.** Existing licence holders will have until December 2003 to prepare an action plan and until December 2006 to implement that plan.
- **Is supported by a range of services that will assist businesses in achieving compliance.** A tool kit will be produced to assist businesses in identifying opportunities to improve energy efficiency and reduce greenhouse gas emissions. Until the tool kit is available, preliminary supporting materials for this protocol are available from EPA.

2 STEPS TOWARDS COMPLIANCE FOR NEW APPLICANTS AND EXISTING LICENCE HOLDERS

This section is in two parts. Section 2.1 outlines the steps that need to be taken by applicants for a licence, an accredited licence, a licence amendment or a works approval to demonstrate compliance with the greenhouse and energy efficiency provisions of the protocol. Section 2.2 outlines the steps that need to be taken by existing licence holders to

demonstrate compliance with the greenhouse and energy efficiency provisions of the protocol.

2.1 Requirements and procedural steps for applicants

EPA currently requires details of environmental management procedures and continuous improvement programs, which may be included in an EIP, to be submitted by applicants for a licence, an accredited licence, a licence amendment or a works approval.

These applicants will need to demonstrate, through these details, that they have identified, and will be implementing, best practice in relation to energy use and greenhouse gas emissions associated with the works/activities/processes that are the subject of the application.

The steps to be taken, and the nature of the information that needs to be provided are outlined below.

Applicants for a research, development and demonstration approval are not required to comply with the steps outlined below. They should consider the greenhouse gas emissions and energy consumption and efficiency associated with the subject of the approval. A full assessment of the greenhouse impacts, including energy consumption, for the project must be included in the trial outcome report.

Step 1: Estimate energy consumption

Estimate the annual energy consumption, in gigajoules, by energy type and the associated greenhouse gas emissions, including use of fuels on-site and consumption of electricity. Estimates of

the greenhouse gas emissions associated with expected energy use should also be made in CO₂-equivalent terms, based on conversion factors for various energy types prepared by the Australian Greenhouse Office, also provided in the supporting materials for this Protocol.

Step 2: Estimate direct greenhouse gas emissions

Where the works/activities/processes that are the subject of the application will generate non-energy related greenhouse gas emissions, the annual levels of such emissions, in CO₂-equivalent terms, should be estimated. Emission estimation methodologies are provided in the supporting materials for this Protocol.

Step 3: Identify and evaluate opportunities to reduce greenhouse gas emissions

Reducing energy use/improving energy efficiency

Identify and evaluate opportunities to reduce energy use and, where applicable, non-energy related greenhouse gas emissions associated with the works/activities/process that are/is the subject of the application, as follows:

- Where the anticipated level of energy use associated with the application is less than 500 gigajoules per annum (or less than 100 tonnes of energy-related CO₂-equivalent emissions per annum), applicants will not be required to identify and evaluate options to reduce energy consumption as part of their application.
- Where the anticipated level of energy use associated with the application is 500 gigajoules per annum or more (or greater than 100 tonnes of energy-related CO₂-equivalent

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emissions per annum), applicants will be required to identify and implement best practice with respect to the activities that are the subject of the application. The supporting materials to this protocol provide a guide to the range of issues that should be considered.

Reducing non-energy related greenhouse gas emissions

Where the proposed works will generate non-energy related greenhouse gas emissions, applicants will be required to identify and implement best practice with respect to the activities that are the subject of the application.

Note – actions that an enterprise has committed to implementing through membership of the Energy Smart Business or Greenhouse Challenge programs – and which are relevant to the subject of the application – should be documented and will be taken into account by EPA when assessing compliance with the requirements of this protocol. EPA licence holders are encouraged to join the Energy Smart Business or other government programs that provide advice and support on energy efficiency and waste management. Larger businesses are also encouraged, where appropriate, to join the Greenhouse Challenge program.

Step 4: Document steps 1 to 3

Document the information generated in Steps 1 to 3 as part of information on environmental management procedures and programs submitted to EPA with the application.

Once applicants have a licence they will be required to manage greenhouse gas emissions and energy consumption as part of their integrated

environmental management practices. In particular, they will be required to comply with Steps 6 and 7 of section 2.2.

2.2 Requirements and procedural steps for existing licence holders

All current EPA licence holders will need to demonstrate compliance with this protocol within the specified timetables outlined below. EPA will assess compliance by reference to the actions and reporting requirements outlined below.

There will be two stages of compliance: an initial stage in which an action plan to reduce energy use and/or non-energy related greenhouse gas emissions is prepared; and an implementation stage through which the action plan is put into effect.

2.2.1 Stage one: Preparation of an Action Plan

Step 1: Conduct an energy audit and estimate energy consumption

An energy audit is an important first step as it provides estimates of energy consumption and will assist in identifying options for inclusion in the action plan outlined in Step 3.

As part of an energy audit, estimate annual energy consumption, in gigajoules, by energy type, covering use of fuels on site and consumption of electricity generated off site. Estimates of the greenhouse gas emissions associated with expected energy use should also be made in CO₂-equivalent terms, based on the conversion factors for various energy types provided in the supporting material.

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The level of energy audit required will vary according to a licence holder's level of energy use and the level of greenhouse gas emissions associated with that energy use – as outlined in the following table.

Level of energy use	Level of energy audit required [~]
< 500 gigajoules p.a. OR < 100 tonnes of energy-related CO ₂ -equivalent emissions p.a.	Energy audit not required
500 to 7,000 gigajoules p.a. OR 100 to 1,400 tonnes of energy-related CO ₂ -equivalent emissions p.a.	Undertake level 1 audit
> 7,000 gigajoules p.a. OR >1,400 tonnes of energy-related CO ₂ -equivalent emissions p.a.	Undertake a minimum of a level 2 audit [#]

Where an enterprise has undertaken an energy audit consistent with the requirements specified in the Australian Standard within three years prior to the date of operation of this protocol, and has implemented the actions recommended by that audit, this should be documented (see Step 4) and can be used as a basis to demonstrate compliance with requirements under this protocol. Energy audits undertaken more than three years prior to the date of operation of this protocol may also be used to demonstrate compliance – this will be considered on a case-by-case basis through discussions

[~] in accordance with Australian Standard 3598: Energy Audits

[#] Note that while a level 2 audit is that required by this protocol, a comprehensive audit (level 3) provides a detailed analysis of areas where energy and cost savings can be achieved and assistance in developing action and implementation plans. Greater cost savings are likely to be achieved from a higher level audit.

between the licence holder and the EPA client manager.

Step 2: Estimate direct greenhouse gas emissions

Where an enterprise is emitting non-energy related greenhouse gases, the annual levels of such emissions, presented in CO₂-equivalent terms, should be estimated. Emission estimation methodologies are provided in the supporting material to this protocol.

A listing of the greenhouse gas emissions associated with various industrial activities and processes, and emission estimation methodologies are also provided in the supporting material.

Step 3: Identify opportunities to reduce greenhouse gas emissions

Identify and evaluate opportunities to reduce energy use and, where applicable, non-energy related greenhouse gas emissions as follows.

Reducing energy use/improving energy efficiency

Where a licence holder's annual level of energy use is less than 500 gigajoules per annum (or less than 100 tonnes of energy-related CO₂-equivalent emissions per annum), the licence holder will not be required to identify and evaluate options to reduce energy consumption.

Where a licence holder's annual level of energy use is 500 to 7,000 gigajoules per annum (or 100 to 1,400 tonnes of energy-related CO₂-equivalent emissions per annum), and where the level one energy audit conducted has indicated that energy use is 'excessive', the licence holder will be required to prepare an action plan that addresses the causes of such 'excessive' energy use. The supporting

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materials to this protocol provide a guide to the range of issues that should be considered in this context.

Where a licence holder's annual level of energy use is more than 7,000 gigajoules per annum (or more than 1,400 tonnes of energy-related CO₂-equivalent emissions per annum), the licence holder will be required to prepare an action plan for implementing measures identified by the energy audit (which must be at least a level two audit) and which are consistent with the definition of eco-efficient and best practices.

Reducing non-energy related greenhouse gas emissions

Where the licence holder's operations generate non-energy related greenhouse gas emissions, the licence holder will be required to include in the action plan, the actions to be taken to reduce these emissions consistent with the definition of best practice.

Note – actions that an enterprise has implemented, or is committed to implementing through membership of the Energy Smart Business or Greenhouse Challenge programs, should be documented in the action plan, and will be taken into account by EPA as contributing to compliance with the requirements of this protocol. EPA licence holders are encouraged to join the Energy Smart Business or other government programs that provide advice and support on energy efficiency and waste management. Larger businesses are also encouraged, where appropriate, to join the Greenhouse Challenge program.

Action plans for reducing energy use and/or non-energy related greenhouse gas emissions should be

integrated as part of an enterprise's overall environmental management procedures and programs – including as part of a licence holder's EIP where one has been, or is being, developed. They should be developed in consultation with EPA, and EPA approval of the final action plan must be obtained.

Step 4: Document steps 1 to 3

Document the information generated in Steps 1 to 3 in a report to EPA by December 2003.

2.2.2 Stage two: Implementation of the Action Plan

Step 5: Implementation of action plan

The action plan will generally be required to be fully implemented by December 2006 but implementation can, of course, be completed prior to this date.

Where a licence holder is planning an upgrade of facilities or significant asset replacements after December 2006, implementation of some actions may be delayed to take into account the timing of these upgrades/asset replacements. Where this is the case, it should be discussed with EPA during the development of the action plan.

Step 6: Ongoing reporting to EPA

Once the action plan has been developed and submitted to EPA, the following information will need to be included in the licence holder's annual report to EPA:

- annual energy consumption, and the greenhouse gas emissions associated with this energy consumption;

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- where applicable, annual non-energy related greenhouse gas emissions; and
- a summary of actions implemented from the action plan over the year, and a list of actions to be implemented in the following year.

Step 7: Regular review

In the longer term, it will be important for the licence holder to review their operations to identify whether there are opportunities to take further steps to reduce energy use and/or non-energy related greenhouse gas emissions. In particular, new practices and technologies can be expected to emerge over time – ‘best practice’ is not a static concept. This should be undertaken as part of the ongoing review and refinement of the enterprise’s EIP.

3 OPTIONAL ACTIONS THAT LICENCE HOLDERS MAY CONSIDER TO REDUCE GREENHOUSE GAS EMISSIONS

In addition to meeting the requirements outlined in this protocol, EPA licence holders are encouraged, though not required, to consider other opportunities to reduce greenhouse gas emissions associated with their own operations and in the wider community, including:

- Product stewardship – to minimise the life cycle greenhouse and energy impacts of their products and services. This is of particular significance in relation to the manufacture of appliances or equipment that consume energy and therefore have a significant ongoing impact on greenhouse gas emissions throughout their

useful life. Licence holders are encouraged to consider and, where practicable, minimise the greenhouse impacts of such products.

- Reducing third party emissions – to work with suppliers, distributors and local/regional industry groups to influence their greenhouse gas emissions, including through participation in programs such as the Sustainable Energy Authority’s Energy Smart Leaders Program and the Greenhouse Challenge Office’s Greenhouse Allies program.
- Consideration of greenhouse impacts of transport use.
- Public Environmental Reporting: In addition to reports required by EPA as a condition of their licence, licence holders are encouraged to report greenhouse gas emissions along with other environmental aspects, impacts and achievements to stakeholders as part of a Public Environmental Report. This would demonstrate programs and technologies being implemented and their results to the community. This can have benefits for the business including:
 - improving stakeholder relations;
 - creating market opportunities;
 - providing greater control over environmental disclosure;
 - gaining the confidence of investors, insurers and financial institutions;
 - triggering internal improvements in environmental performance; and
 - providing external recognition.

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- Purchase of 'Green Power' or investment in other renewable energy sources.
- Investment in carbon sink enhancement, for example, through tree planting.

4 GLOSSARY

CO ₂ -equivalent	Global warming potential factors are provided in the supporting material
EIP	Environment Improvement Plan
GJ	gigajoules
MWh	megawatt-hour
PEM	Protocol for Environmental Management
SEPP (AQM)	State environment protection policy (Air Quality Management)

5 REFERENCES

Australia/ New Zealand Standard- AS/NZS 3598:2000 Energy Audit

Australian Greenhouse Office – Greenhouse Challenge: www.greenhouse.gov.au/challenge/

Sustainable Energy Authority Victoria – Energy Smart Business Program: www.seav.vic.gov.au/business/

Environment Protection (Scheduled Premises and Exemptions) Regulations 1996: www.dms.dpc.vic.gov.au

EPA Victoria - State environment protection policy (Air Quality Management) www.epa.vic.gov.au

Victorian Greenhouse Strategy – www.greenhouse.vic.gov.au